Abstract of the Disclosure

A contactless rotary shaft rotation sensor includes a two-pole annular magnet attached directly to the shaft, pairs of diametrically opposed magnetic field sensors, and electronic processing circuits to produce linear output signals proportional to shaft speed and position. The annular magnet has two diametrically opposed poles on its outside circumference and is magnetized with a magnetic iron pole piece temporarily placed through its inner diameter to magnetically shape the poles and provide an extremely linear flux variation over plus and minus sixty degrees from the neutral position between the poles. Positioning one pair of magnetic field sensors around the magnet enables provision of a voltage signal that is proportional to the angular position and/or speed of the shaft through 120 degrees of rotation. Placing three pairs of magnetic field sensors around the magnet with 120-degrees of spacing provides three linear sensor output segments, each with a useful range of 120-degrees of shaft rotation. The magnetic field sensors are also used to signal the limits of each sensor pair's range and in conjunction with commutation logic, provide a linear angular position signal, or via piecewise differentiation provide a contactless analog tachometer signal. The commutation and signal processing functions are implemented with electronic logic and analog circuits or with a microcomputer.